E 1.28:SOLAR/2011-79/04

Aleph 1214325

SOLAR/2011-79/04

Monthly Performance Report

TERRELL D. MOSELEY

APRIL 1979

FEB 14 1980

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, nor any of their contractors, subcontractors, or their employees, make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

MONTHLY PERFORMANCE REPORT
TERRELL D. MOSELEY
APRIL 1979

I. SYSTEM DESCRIPTION

The Terrell D. Moseley Co. site is a 1,780-square foot, single-story, commercial office building with attached warehouse in Lynchburg, Virginia. The solar energy system is designed to provide approximately 70 percent of the space heating and hot water energy requirements of the office building. Because the hot water consumption is very low (nominally 10 gallons per day), only the space heating system is monitored for performance evaluation. The site has a collector array of 24 flat-plate collector panels built by T. D. Moseley. The collector array has a gross area of 400 square feet, and faces south at a tilt angle of 50 degrees from the horizontal. Water is the heat transfer medium throughout the solar energy system. Collected solar energy is delivered to the 2,000-gallon storage tank, which is in an unheated attached warehouse building. The insulation on the tank is four inches of fiberglass.

When solar energy is insufficient to maintain a nominal 105°F storage temperature, a natural gas-fired boiler (auxiliary heater) provides additional energy to storage. Space heating is provided by circulating storage water through a heat exchanger located in the air distributuion system of the building. Since the collector fluid automatically drains into storage after each solar energy collection operation, additional collector freeze protection measures are not required.

The system, shown schematically in Figure 1, has three modes of solar operation, which are described below.

Mode 1 - Collector-to-Storage: This mode is entered when the collector absorber plate temperature exceeds the bottom storage temperature by 20°F. The transfer fluid is pumped from storage through the collectors

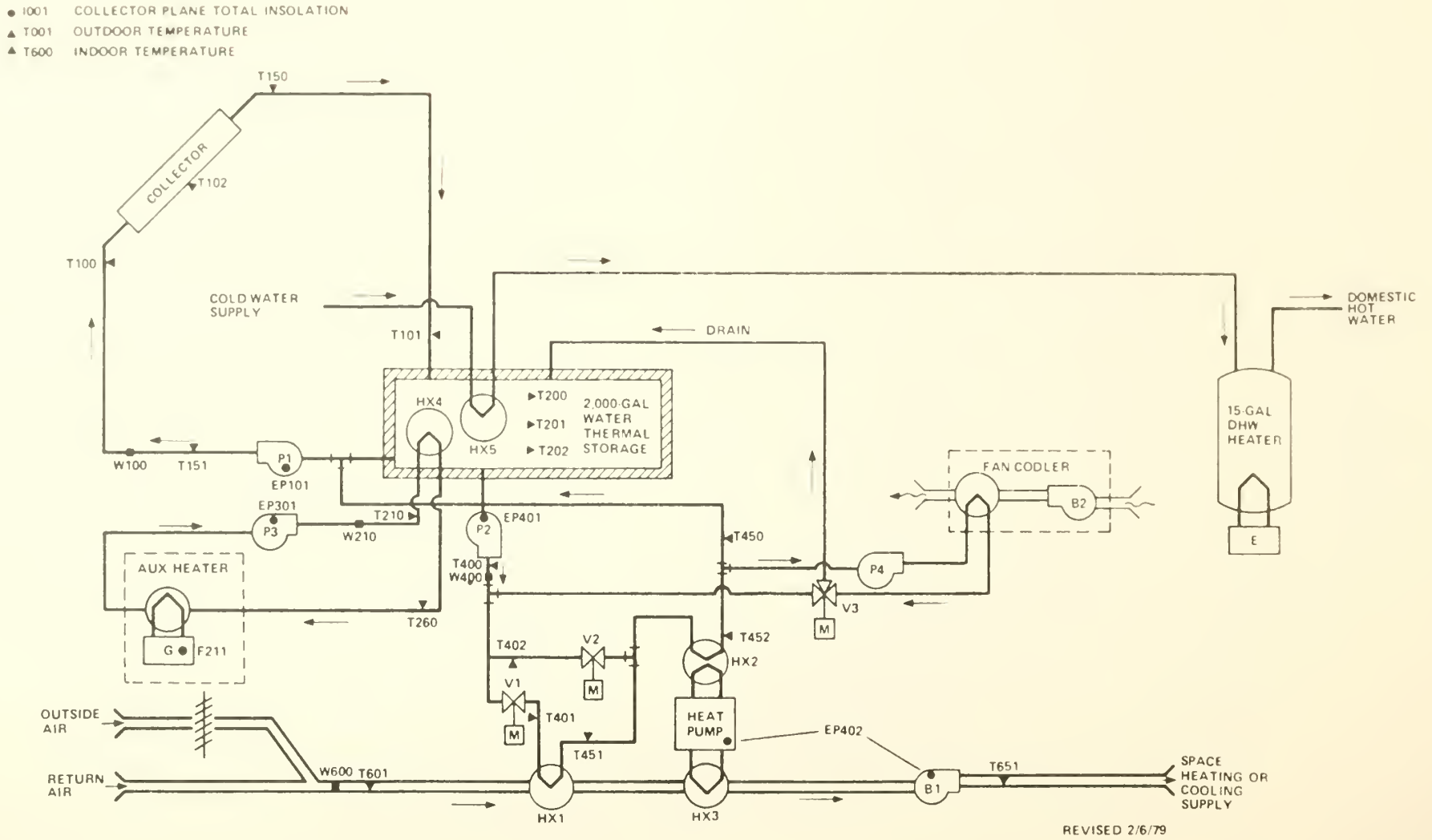

Figure 1. T. D. MOSELEY SOLAR ENERGY SYSTEM SCHEMATIC

and back to storage until this temperature differential drops to less than a nominal 3°F.

Mode 2 - Storage-to-Space Heating: This mode is entered when there is a demand for space heating and the sensed temperature of the storage water is greater than a nominal 85°F. Water is circulated between storage and liquid-to-air heat exchanger HX1 in the air-handling unit distribution duct until the space heating demand is satisfied, or the sensed storage temperature drops below 85°F.

Mode 3 - Storage-to-Heat Pump: This mode of operation will provide space heating when Mode 2 operation is not available. This mode is entered when there is a demand for space heating and the temperature of the storage water is below 85°F. Energy input to the heat pump is supplied by opening the normally closed valve V2, closing the normally open valve V1, and circulating storage water through heat pump evaporator HX2. This mode is terminated when either the sensed storage temperature rises above 90°F, or when no space heating demand exists.

II. PERFORMANCE EVALUATION

The system performance evaluations discussed in this section are based primarily on the analysis of the data presented in the attached computer-generated monthly report. This attached report consists of daily site thermal and energy values for each subsystem, plus environmental data. The performance factors discussed in this report are based upon the definitions contained in NBSIR 76-1137, Thermal Data Requirements and Performance Evaluation Procedures for the National Solar Heating and Cooling Demonstration Program.

A. Introduction

The solar energy system at the T. D. Moseley site was operational throughout April, and satisfied 80 percent of the space heating energy requirements.

The solar energy system saved 2.41 million Btu of fossil fuel energy, at the expense of 0.46 million Btu of electrical operating energy. No data was available for performance evaluation on April 5 due to instrumentation maintenance during a site visit.

B. Weather

The long-term average outside ambient temperature for April in Lynchburg, Virginia is 57°F. The measured average outside ambient temperature was 57°F. The measured insolation in the plane of the collector array averaged 1,334 Btu/ft^2-day, which is 11 percent below normal for the area. The long-term average is 1,495 Btu/ft^2-day. Long-term average temperature data and long-term average insolation data are taken or derived from the Monthly Environmental Data for Systems in the National Solar Data Network, Department of Energy Report SOLAR/0019-79/36.

C. System Thermal Performance

Collector - Of the 16.00 million Btu of solar energy incident on the collector array during April, 13.16 million Btu were incident on the array when the collector pump P1 (Figure 1) was operating. The system collected 3.27 million Btu, or 20 percent of the total insolation incident on the collector array. The operational collector array efficiency, which is only computed during collector pump operation, was 25 percent. In addition to collecting energy, the array rejected 0.17 million Btu from storage as a result of collector pump operation during periods of insufficient insolation levels. This amount of rejected energy is included in the performance calculations for solar-energy-collected, energy-to-storage, and collector array efficiency. The operation of pump P1 required 0.38 million Btu.

Storage - The solar energy system delivered 2.85 million Btu to storage during April. There was an apparent transport energy loss of 0.42 million Btu between the collectors and storage. The auxiliary heater supplied 0.41 million Btu of auxiliary thermal energy to storage. A total of

1.81 million Btu was extracted from storage during the month and sent to the conditioned space. The average storage temperature was 124°F. The energy loss from storage was 1.59 million Btu, which was computed by subtracting the sum of the change in storage energy (-0.14 million Btu) and the energy removed from storage, from the total thermal energy delivered to storage (3.26 million Btu). The amount of energy supplied to the domestic hot water (DHW) subsystem is included in this energy loss calculation because the DHW subsystem is not instrumented for performance evaluation.

Space Heating Load - The space heating load for April was calculated to be 1.81 million Btu. Solar energy satisfied 80 percent of the space heating load. The subsystem operated in Mode 2 throughout the month when space heating was required. Auxiliary thermal energy, 0.36 million Btu, was supplied to the space heating subsystem via the storage tank through the operation of the auxiliary heater. The electrical energy needed to operate pumps P2 and P3, and the blower B1 amounted to 0.19 million Btu.

D. Observations

Due to a site visit for instrumentation maintenance on April 5, a significant number of measurements were invalid which prevented an accurate calculation of performance factors for that day. The measurement bias on measurement W210, which was mentioned in previous reports, was corrected.

The operational collector array efficiency was calculated to be 19 percent greater than the collector array efficiency as tabulated in the collector array performance data for this report. This result is believed to be due to the high storage temperature (124°F average) for April, which limited the operating time of the collector pump P1 for efficient collection of solar energy.

Auxiliary thermal energy was added to storage on only five days during the month. As a consequence of this reduced operation, the majority of the amount of auxiliary fossil fuel tabulated in the space heating subsystem

performance report was for pilot-light operation, while the natural gas-fired heater remained in a standby condition.

The previously reported erroneous heat transfer condition at the duct heat exchanger HX1 has not been observed to recur since the control signal to valve V2 was removed by the site contractor on March 27. The site contractor indicated that the control signal to V2 is required for space cooling by the heat pump and would therefore have to be restored in May. The calculation of the space heating load performance factor for April was again made from measurements at the space heating outlet of the storage tank. This was because a small (four percent) energy gain was computed between the tank and the load during the month. This condition, although small, is unexplained; therefore, for consistency in the method of reporting the space heating system performance, the calculation remains unchanged.

E. Energy Savings

The T. D. Moseley solar energy system provided savings of 2.41 million Btu of natural gas during April, at the expense of 0.46 million Btu of electricity for operating the solar portion of the system. The savings of 2.41 million Btu are the natural gas equivalent of the 1.45 million Btu of solar energy removed from storage and supplied to the conditioned space. The burning efficiency of the natural gas boiler used in the fossil fuel savings calculations was assumed to be 0.60.

III. ACTION STATUS

A site visit was made to the Terrell D. Moseley site for instrumentation maintenance. During this visit (April 5 and 6), the erroneous flow indication from flow sensor W210 was corrected.

SOLAR HEATING AND COCLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MOSELEY
REPORT PERIOD: APRIL,1979

SOLAR/2011-79/04

SITE/SYSTEM DESCRIPTION:
T. D. MOSELEY SOLAR ENERGY SYSTEM IS DESIGNED TO PROVIDE HEATING FOR A 1,780 SQUARE FOOT OFFICE BUILDING. ENERGY COLLECTION AND STORAGE IS PROVIDED BY A 400 SQUARE FOOT FLAT-PLATE COLLECTOR ARRAY AND A 2,000 GALLON STORAGE TANK. WATER IS USED AS THE HEAT COLLECTION, TRANSFER, AND STORAGE FLUID. SPACE HEATING IS PROVIDED BY A WATER/AIR HEAT EXCHANGER LOCATED IN THE AIR HANDLER UNIT DUCTING.A NATURAL GAS-FIRED BOILER PROVIDES THERMAL ENERGY TO STORAGE TO SUPPLEMENT SOLAR ENERGY.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	16.006	MILLION BTU
	40014	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	3.272	MILLION BTU
	8180	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	57	DEGREES F
AVERAGE BUILDING TEMPERATURE	71	DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.09	
ECSS OPERATING ENERGY	0.379	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.566	MILLION BTU
TOTAL ENERGY CONSUMED	5.569	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	1.807	N.A.	1.807 MILLION BTU
SOLAR FRACTION	N.A.	80	N.A.	80 PERCENT
SOLAR ENERGY USED	N.A.	1.448	N.A.	1.448 MILLION BTU
OPERATING ENERGY	N.A.	0.187	N.A.	0.566 MILLION BTU
AUX. THERMAL ENERGY	N.A.	0.359	N.A.	0.359 MILLION BTU
AUX. ELECTRIC FUEL	N.A.	0.000	N.A.	0.000 MILLION BTU
AUX. FOSSIL FUEL	N.A.	1.722	N.A.	1.722 MILLION BTU
ELECTRICAL SAVINGS	N.A.	-0.079	N.A.	-0.457 MILLION BTU
FOSSIL SAVINGS	N.A.	2.413	N.A.	2.413 MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.501

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MOSELEY
REPORT PERIOD: APRIL,1979

SOLAR/2011-79/04

SITE/SYSTEM DESCRIPTION:
T. D. MOSELEY SOLAR ENERGY SYSTEM IS DESIGNED TO PROVIDE HEATING FOR A 1,780 SQUARE FOOT OFFICE BUILDING. ENERGY COLLECTION AND STORAGE IS PROVIDED BY A 400 SQUARE FOOT FLAT-PLATE COLLECTOR ARRAY AND A 2,000 GALLON STORAGE TANK. WATER IS USED AS THE HEAT COLLECTION, TRANSFER, AND STORAGE FLUID. SPACE HEATING IS PROVIDED BY A WATER/AIR HEAT EXCHANGER LOCATED IN THE AIR HANDLER UNIT DUCTING.A NATURAL GAS-FIRED BOILER PROVIDES THERMAL ENERGY TO STORAGE TO SUPPLEMENT SOLAR ENERGY.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	16.886 GIGA JOULES
	454300 KJ/SQ.M.
COLLECTED SOLAR ENERGY	3.452 GIGA JOULES
	92894 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	14 DEGREES C
AVERAGE BUILDING TEMPERATURE	21 DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.09
ECSS OPERATING ENERGY	0.399 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.597 GIGA JOULES
TOTAL ENERGY CONSUMED	5.875 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	1.907	N.A.	1.907 GIGA JOULES
SOLAR FRACTION	N.A.	80	N.A.	80 PERCENT
SOLAR ENERGY USED	N.A.	1.528	N.A.	1.528 GIGA JOULES
OPERATING ENERGY	N.A.	0.197	N.A.	0.597 GIGA JOULES
AUX. THERMAL ENG	N.A.	0.379	N.A.	0.379 GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	0.000	N.A.	0.000 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	1.817	N.A.	1.817 GIGA JOULES
ELECTRICAL SAVINGS	N.A.	-0.083	N.A.	-0.482 GIGA JOULES
FOSSIL SAVINGS	N.A.	2.546	N.A.	2.546 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.501

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: MOSELEY
REPORT PERIOD: APRIL,1979

SOLAR/2011-79/04

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.420	68	0.000	0.000	0.011	N	0.000
2	0.266	65	0.032	0.000	0.007	O	0.094
3	0.050	54	0.013	0.000	0.000	T	0.200
4	0.037	45	0.171	0.143	0.000		3.497
5	*	*	*	*	*	A	*
6	0.863	48	0.179	0.000	0.016	P	0.142
7	0.901	48	0.135	0.075	0.019	P	0.108
8	0.737	59	0.059	0.000	0.017	L	0.059
9	0.387	53	0.078	0.000	0.007	I	0.157
10	0.870	49	0.168	0.000	0.018	C	0.153
11	0.680	54	0.111	0.000	0.015	A	0.135
12	0.432	65	0.036	0.000	0.015	B	0.073
13	0.044	52	0.024	0.000	0.000	L	0.477
14	0.703	54	0.053	0.000	0.019	E	0.065
15	0.454	54	0.073	0.000	0.008		0.144
16	0.556	50	0.114	0.054	0.010		0.181
17	0.497	50	0.142	0.074	0.015		0.241
18	0.878	55	0.116	0.051	0.019		0.105
19	0.874	58	0.087	0.000	0.019		0.081
20	0.826	56	0.039	0.000	0.018		0.040
21	0.789	60	0.010	0.000	0.018		0.011
22	0.529	68	0.000	0.000	0.016		0.000
23	0.308	67	0.008	0.000	0.010		0.023
24	0.306	65	0.010	0.000	0.012		0.029
25	0.402	66	0.000	0.000	0.014		0.000
26	0.082	61	0.000	0.000	0.000		0.000
27	0.540	63	0.000	0.000	0.016		0.000
28	0.515	55	0.000	0.000	0.011		0.000
29	0.755	52	0.030	0.000	0.018		0.036
30	0.770	57	0.058	0.000	0.016		0.070
SUM	16.006	-	1.807	0.411	0.379	N.A.	-
AVG	0.534	57	0.060	0.014	0.013	N.A.	0.090
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: MCSELEY
REPORT PERIOD: APRIL,1979

SOLAR/2011-79/04

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.420	0.289	0.051	77	0.121
2	0.266	0.123	-0.001	69	-0.002
3	0.050	0.000	0.000	55	0.000
4	0.037	0.000	0.000	44	0.000
5	*	*	*	*	*
6	0.863	0.773	0.214	54	0.248
7	0.901	0.830	0.226	52	0.251
8	0.737	0.658	0.195	63	0.265
9	0.387	0.261	0.048	59	0.123
10	0.870	0.786	0.233	54	0.268
11	0.680	0.598	0.192	65	0.282
12	0.432	0.357	0.061	71	0.142
13	0.044	0.000	0.000	52	0.000
14	0.703	0.656	0.181	60	0.257
15	0.454	0.310	0.075	61	0.165
16	0.556	0.407	0.110	54	0.197
17	0.497	0.374	0.058	58	0.117
18	0.878	0.801	0.242	62	0.276
19	0.874	0.798	0.237	65	0.271
20	0.826	0.742	0.203	65	0.246
21	0.789	0.700	0.177	70	0.224
22	0.529	0.464	0.093	79	0.176
23	0.308	0.177	-0.007	75	-0.023
24	0.306	0.208	0.003	67	0.010
25	0.402	0.299	0.043	72	0.107
26	0.082	0.000	0.000	61	0.000
27	0.540	0.445	0.080	68	0.148
28	0.515	0.332	0.078	66	0.152
29	0.755	0.673	0.172	62	0.228
30	0.770	0.661	0.199	68	0.259
SUM	16.006	13.160	3.272	-	-
AVG	0.534	0.439	0.109	63	0.204
NBSID	0001		0100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: MOSELEY
REPORT PERIOD: APRIL,1979

SOLAR/2011-79/04

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.036	0.000	-0.021	135	-0.589
2	-0.008	0.032	-0.117	130	11.008
3	0.000	0.013	-0.119	122	1.000
4	0.143	0.171	-0.094	113	0.539
5	*	*	*	*	*
6	0.192	0.170	-0.038	117	0.729
7	0.286	0.135	0.147	120	0.989
8	0.174	0.059	0.055	127	0.657
9	0.031	0.078	-0.123	125	-1.420
10	0.214	0.168	0.010	120	0.820
11	0.173	0.111	0.005	121	0.671
12	0.048	0.036	-0.028	121	0.183
13	0.000	0.024	-0.135	116	1.000
14	0.162	0.053	0.110	115	1.005
15	0.063	0.073	-0.084	116	-0.174
16	0.148	0.114	0.017	113	0.880
17	0.118	0.142	0.003	114	1.226
18	0.280	0.116	0.160	119	0.987
19	0.215	0.087	0.076	127	0.757
20	0.183	0.039	0.082	133	0.664
21	0.155	0.010	0.078	138	0.564
22	0.078	0.000	0.006	141	0.082
23	-0.021	0.008	-0.108	137	4.816
24	-0.008	0.010	-0.082	131	9.242
25	0.014	0.000	-0.031	128	-2.213
26	0.000	0.000	-0.094	123	1.000
27	0.066	0.000	0.051	123	0.773
28	0.069	0.000	0.010	125	0.139
29	0.153	0.030	0.075	127	0.685
30	0.183	0.058	0.059	131	0.639
SUM	3.257	1.807	-0.135	-	-
AVG	0.109	0.060	-0.005	124	0.513
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: MOSELEY
REPORT PERIOD: APRIL,1979

SOLAR/2011-79/04

DAY OF MCN.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.000	0	0.000	0.000	0.000	0.000	0.030	0.000	0.000	70	68
2	0.032	78	0.025	0.002	0.007	0.000	0.025	-0.000	0.042	72	65
3	0.013	78	0.010	0.001	0.003	0.000	0.005	-0.001	0.017	71	54
4	0.171	76	0.129	0.021	0.041	0.000	0.234	-0.011	0.215	71	45
5	*	*	*	*	*	*	*	*	*	*	*
6	0.179	69	0.123	0.018	0.056	0.000	0.022	-0.007	0.204	70	48
7	0.135	72	0.098	0.016	0.038	0.000	0.213	-0.008	0.163	68	48
8	0.059	74	0.043	0.005	0.015	0.000	0.025	-0.001	0.072	67	59
9	0.078	78	0.061	0.007	0.017	0.000	0.025	-0.002	0.101	71	53
10	0.168	79	0.133	0.015	0.035	0.000	0.021	-0.005	0.222	72	49
11	0.111	83	0.092	0.010	0.019	0.000	0.023	-0.004	0.153	71	54
12	0.036	86	0.031	0.003	0.005	0.000	0.023	-0.001	0.052	72	65
13	0.024	87	0.021	0.003	0.003	0.000	0.023	-0.001	0.035	71	52
14	0.053	87	0.046	0.006	0.007	0.000	0.025	-0.003	0.076	67	54
15	0.073	89	0.066	0.007	0.008	0.000	0.026	-0.003	0.109	67	54
16	0.114	89	0.101	0.016	0.013	0.000	0.173	-0.009	0.168	70	50
17	0.142	85	0.120	0.018	0.022	0.000	0.288	-0.010	0.200	71	50
18	0.116	79	0.092	0.015	0.024	0.000	0.195	-0.008	0.153	71	55
19	0.087	81	0.071	0.007	0.017	0.000	0.024	-0.002	0.118	72	58
20	0.039	85	0.033	0.003	0.006	0.000	0.028	-0.000	0.056	71	56
21	0.010	87	0.009	0.001	0.001	0.000	0.022	-0.000	0.014	68	60
22	0.000	0	0.000	0.000	0.000	0.000	0.024	0.000	0.000	69	68
23	0.008	90	0.007	0.001	0.001	0.000	0.024	-0.000	0.012	73	67
24	0.010	90	0.009	0.001	0.001	0.000	0.023	-0.000	0.015	73	65
25	0.000	0	0.000	0.000	0.000	0.000	0.023	0.000	0.000	74	66
26	0.000	0	0.000	0.000	0.000	0.000	0.023	0.000	0.000	73	61
27	0.000	0	0.000	0.000	0.000	0.000	0.023	0.000	0.000	73	63
28	0.000	0	0.000	0.000	0.000	0.000	0.017	0.000	0.000	70	55
29	0.030	91	0.028	0.002	0.003	0.000	0.024	-0.001	0.046	68	52
30	0.058	92	0.054	0.004	0.004	0.000	0.027	-0.001	0.090	71	57
SUM	1.807	-	1.448	0.187	0.359	0.000	1.722	-0.079	2.413	-	-
AVG	0.060	80	0.048	0.006	0.012	0.000	0.057	-0.003	0.080	71	57
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NOT DATA
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: MOSELEY
REPORT PERIOD: APRIL, 1979

SOLAR/2011-79/04

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	1049	N	68	77	N	N	N
2	665	O	65	69	O	O	O
3	126	T	54	55	T	T	T
4	92		45	44			
5	*	A	*	*	A	A	A
6	2159	P	48	54	P	P	P
7	2252	P	48	52	P	P	P
8	1843	L	50	63	L	L	L
9	968	I	53	59	I	I	I
10	2176	C	40	54	C	C	C
11	1600	A	54	65	A	A	A
12	1079	B	65	71	B	B	B
13	109	L	52	52	L	L	L
14	1750	E	54	60	E	E	E
15	1134		54	61			
16	1391		50	54			
17	1242		50	58			
18	2196		55	62			
19	2185		58	65			
20	2065		56	65			
21	1973		60	70			
22	1322		68	79			
23	760		67	75			
24	764		65	67			
25	1006		66	72			
26	204		61	61			
27	1351		63	68			
28	1288		55	66			
29	1888		52	62			
30	1926		57	68			
SUM	40014	N.A.	-	-	-	-	-
AVG	1334	N.A.	57	63	N.A.	N.A.	N.A.
NBS ID	0001		N113			N115	N114

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

UNIVERSITY OF FLORIDA
3 1262 09052 6822